4/29/80

ROTATION CONTROLLER

NOTES ON DIRECTION OF ROTATION

1. Initial Angle Load push button is also Direction Load push button.

2. To reverse direction at any angle other than 0°, 90°, 180°, 270°, push Direction Reverse and then Initial Angle Load. If you don't push Initial Angle Load after Direction Reverse, the next pass will be the new direction, but subsequent passes will be the old direction, because the new direction was not loaded into memory.

3. To reverse direction at 0°, 90°, 180°, 270°, push Manual Clock, Direction Reverse, Manual Clock and Initial Angle Load. This must be done because the direction can not be reversed at these points, and you must first step off one step, then reverse, then step back.

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Operating Procedure
Rotation Controller

The Rotation Controller provides a means by which the Scanimate raster may be rotated about the "Z" or depth axis. The system may be used for animation sequences or simply for making best use of raster space. The raster space may be best used by designing the artwork with all sections layed out horizontally and then rotated until the proper position is obtained. This means that a long vertical piece of artwork may be placed on the cell horizontally requiring only a few horizontal lines instead of the whole raster.

The Controller has the capability of rotating up to five sections. Each section may be controlled independently. The rate of rotation, direction (cw or ccw) or mode of operation of each section may be different for each section.

The rotation rate controls are a ten turn pot, x1/10x switch and man button. The pot changes rate approximately by a ratio of 10 to 1. Minimum is ccw, maximum is cw. The x1/x10 switch multiplies the rate by a factor of ten when in the x10 position. The rotation rate may be slowed to ease set up of the various modes and then reset to the desired rate after everything is set up.

The manual button may be used to rotate the raster manually. The raster will rotate about 0.7° each time the button is pressed. The manual button will work only when the "start/stop" switch is in the "stop" position.

The "direction reverse" button changes the direction of rotation. It may be pressed at any time. The raster may be rotating or stopped. If it is rotating, it will change directions immediately. If the raster is stopped it will change the direction from the way it was previously rotating.

The "section selector" switch selects the section that the "initial angle load", "final angle load", "section reset" and "number of revolution load" will control. The section that is being set up must be selected by this switch.

The "initial angle load" button will load the section angle and direction of rotation into a storage register. The raster section will rotate to this angle whenever the Scanimate "initial/final" switch is moved from final to initial. The angle is stored when the button is released. The "section selector" switch must be used with this button.

The "final angle load" button is used to store a final angle for use in the "initial/final" mode, the "finite rotation" mode, the "continuous oscillation" mode and the "finite oscillation" mode. The "section selector" switch must be used with this button.

The "Section reset" button is used to set the section that is selected by the "section selector" switch to zero degrees and the raster rotation direction to "CW".

The "number of revolution load" button is used to load the number of revolutions for use in the "finite" modes, one revolution for each time the button is pushed. The "section selector" switch must be used with this button. The maximum number of revolutions that may be stored is 15. If the number of revolutions is to be increased it may be done at any time by simply pushing the button once for each additional rotation desired. If the number is to be decreased, the counter must be reset (for the section) with the "section reset" button and the "*initial angle set*". Then the new count is loaded.

The "initial angle set" button is used to set *all sections* to their preset initial angles and directions. This button is used to set up initial conditions for a sequence after everything else has been set up. It will set all sections to the angle that is stored in each initial angle storage register even if the mode switch is in the "off" mode.

The "axis" or "center" of rotation is controlled by the horizontal and vertical axis commutators. The "axis" is the point about which the section rotates. It may be anywhere inside the section or anywhere outside the section. The axis position may be moved horizontally or vertically when the raster is at zero degrees. However, when the raster is rotated the horizontal and vertical axis rotate with the raster. This has the affect that when the raster is at 90° or 270° the horizontal and vertical commutators have opposite functions. This means that the vertical commutator controls the horizontal axis and vice-versa.

Modes of operation:

There are six modes of operation that may be used. These modes and their function are:

"Off"

In this mode the rate clock is disabled and the section will remain at the angle that is loaded into the initial angle storage register.

This mode may be used when rotation is not required for animation, but to locate a section at an angle other than the angle of the artwork. It must be remembered that the angle that is to be held must be stored in the initial angle storage register. If it is not, the angle will change when the Scanimate initial/final switch is changed from final to initial.

"Initial to final"

In this mode the section will rotate from an initial angle to a final angle ~~at a rate and a~~ in a direction that is preset in the initial and final angle storage registers. The only restriction on this mode is that the transition from initial to final must be less than 360°.

"Rotation Sequence"

This mode synchronizes the rotation to the sequence ramp in Scanimate. When the initial/final switch is actuated the section will rotate from a stored initial angle to a final angle. The final angle is the angle at which the raster happens to be when the electronic switch in Scanimate cuts in. In other words the end of the sequence ramp.

The rotation in this ~~angle~~ mode may be more than 360°, and is limited by the maximum rotation rate and the length of the sequence ramp. However, with fast rotation and long sequence ramps, the final angle may vary considerably each time the ramp is generated due to tolerances in both the sequence ramp generator and the electronic switch threshold.

"Finite Rotation"

This mode provides rotation from a stored initial angle, to the same initial angle, through 360°, a finite number of times, with a maximum number of 15. The number of rotations is preset with the number of revolutions button. One revolution for each time the button is pushed.

When setting up this mode, the final angle storage register must have an angle loaded into it that is less than 360° from the initial angle. This stored angle is used for control of the associated internal circuitry and is absolutely necessary for proper operation in this mode.

Another thing to remember about this mode is that the raster will stop at the initial position after the proper number of rotations, (ie) one revolution is defined as rotation from an initial position thru 360° to initial position.

After setting initial angle and the final angle, press "section reset" to reset the revolution counter to zero. Then press "initial angle set" to set the raster to the initial angle. The number of revolutions may now be stored by pressing the revolution load button once for each revolution desired. This procedure also applies to the finite oscillation mode described later.

"Continuous Oscillation"

Oscillation is defined as rotation from a preset initial angle to a preset final angle,change direction back to the preset initial angle and then repeat the process until the initial/final switch on Scanimate is reset to initial. The oscillation as defined must be less than 360°

When setting up the oscillation,the procedure works best if the final angle is stored first. The angle may be loaded while the raster is moving or the raster may be stopped first. If the angle is stored while moving, keep in mind that the angle is stored when the "load" button is released not when it is depressed, so the switch must be released immediately. The raster rotation direction will change automatically and will start back in the opposite direction. The initial angle is then stored in the same manner.

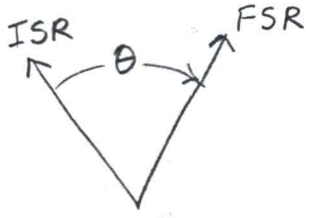
The important thing to remember here is that the raster must be rotating in the direction it will be coming from in the normal operation of the oscillation mode.

"Finite Oscillation"

This mode is set up the same at continuous oscillation. After the angles are stored, the revolution counter must be loaded as described for finite rotation above.

ROTATION MODES

① INITIAL TO FINAL



$\theta \leq 360°$
ISR = any angle
FSR = any angle

Starts when I/F switch is set to F.
Stops when FSR is reached.

1. Set direction
2. Load ISR
3. Load FSR

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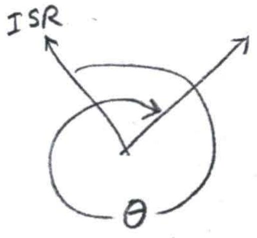
② ROTATION SEQUENCE



θ = any angle
ISR = " "

Starts when I/F switch is set to F,
Stops when End of Sequence occur

May be used for continuous rotation by making Sequence Ram
very long.

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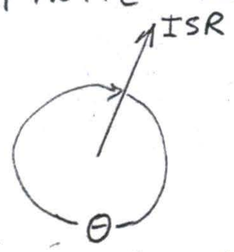
③ FINITE ROTATION



$\theta = n\,360°$
ISR = any
FSR = any

$1 \leq n \leq 15$
n = integer

Starts when I/F switch is set to F.
Stops at ISR after n rotations.

1. Load ISR
2. Press Section Reset
3. Press I Angle Set
4. Load revolutions (n) by pressing Number of Rev Load n times. Not pressing wil give 16

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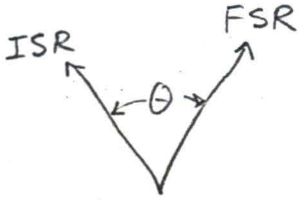
④ CONTINUOUS OSCILLATION



$\theta \leq 360°$

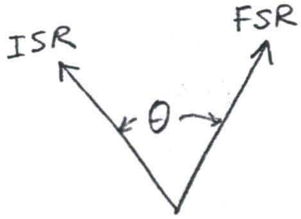
ISR ≠ 0° or 90°
FSR ≠ 0° or 90°

Starts when I/F switch is set to F.
Oscillates between ISR and FSR.
Stops at ISR when I/F switch is set to I.

1. Load FSR
2. Load ISR

ROTATION MODES
(CONT.)

⑤ FINITE OSCILLATION



$\theta \leq 360°$

ISR ≠ 0° or 90°
FSR ≠ 0° or 90°
$1 \leq n \leq 15$
n = integer

Starts when I/F switch is set to F. Oscillates between ISR and FSR. Stops at ISR after n oscillations.

1. Load FSR
2. Load ISR
3. Press Section Reset
4. Press I Angle Set
5. Load oscillations (n)

Notes:

1. Pressing Section Reset (0°) alone does not make the initial angle zero. You must press Section Reset and then Initial Angle Load, and repeat this for each section to be zeroed.
2. ISR = Initial Storage Register
   FSR = Final Storage Register
3. In all modes, rotation starts at ISR with I/F switch at I.
4. To reverse direction at 0°, 90°, 180°, 270° push Manual Clock, Direction Reverse, Manual Clock, and Initial Angle Load
5. Initial Angle Load push button is also Direction Load push button.
6. To reverse direction at any angle other than 0°, 90°, 180°, push Direction Reverse and Initial Angle Load. If you don't push Initial Angle Load after Direction Rever the next pass will be the new direction, but subsequent basses will be the old direction.